10576.204.ST25.txt

```
His Asn Val Ser Asp Ser Ile His Ile Thr Ala Leu Asp Val Thr Asp
    50              55                  60

Glu Gln Ser Ile Val Ser Phe Gly Lys Ala Val Ser Ala Tyr Ala Pro
65                  70                  75                  80

Ile Asp Leu Leu Val Asn Asn Ala Gly Thr Ala Tyr Gly Gly Phe Ile
                85                  90                  95

Glu Asp Val Pro Met Glu His Phe Arg Gln Gln Phe Glu Thr Asn Val
            100             105                 110

Phe Gly Val Ile His Val Thr Lys Thr Val Leu Pro Tyr Ile Arg Lys
        115             120                 125

His Gly Gly Ala Lys Ile Ile Asn Val Ser Ser Ile Ser Gly Leu Thr
    130             135                 140

Gly Phe Pro Ala Leu Ser Pro Tyr Val Ser Ser Lys His Ala Leu Glu
145                 150                 155                 160

Gly Phe Ser Glu Ser Leu Arg Ile Glu Leu Leu Pro Phe Gly Ile Glu
                165                 170                 175

Thr Ala Leu Ile Glu Pro Gly Ser Tyr Lys Thr Ser Ile Trp Ser Thr
            180             185                 190

Ser Leu Ser Asn Phe Met Ser Val Pro Ala Asp Asp Ser Ala Tyr His
        195                 200                 205

Gln Tyr Tyr Lys Lys Ile Leu Ser Tyr Val Gln Lys Asn Gly Glu Glu
    210             215                 220

Ser Gly Asp Pro Gln Glu Val Ala Asp Leu Ile Tyr Gln Leu Ala Thr
225                 230                 235                 240

Lys Gln His Ile Lys Asn Leu Arg Tyr Pro Ile Gly Lys Gly Ile Lys
            245                 250                 255

Leu Thr Leu Leu Phe Arg Ser Leu Phe Pro Trp Ser Ala Trp Glu Ser
            260                 265                 270

Ile Leu Lys Lys Lys Leu Phe Ser
        275             280
```

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<210>   3
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<213>   Bacillus subtilis 168

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```

10576.204.ST25.txt

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tacatattaa atgaaagaag acagagggtt gccgaaaagc ttagccccgg taaggaaaaa    180
ctgatcggaa accttgcggt ggacggatat cacgcttgga gtgacttata caatatggtt    240
gtcgggaaaa tgacgatccc gtatgaggaa aacggtgaaa acaagcaatt gtctgtcggt    300
caggcggaga atatgatgga tcatcaagac cgtactgtca gaaaaacagt atatgaacgt    360
ttccgccaag cttgggagag caagcaagat attttcagca gcacgctgaa tcatttggcg    420
ggattccggc ttgaaaccta taaagcgcgc ggctgggaga atgtcctgaa ggaaccgctg    480
caaattaaca ggatgaaaaa agaaacactt gatacgatgt ggcaggtcat cactgaaaac    540
aagaagccgt tcgttcagtt tttgaaccgg aaagcatcca tgctcggcct tgaaaaactc    600
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gaaaaagcgt tcgggacggc ctggattgag gcggaagaca ggagcggaaa aagagtcggc    780
ggcttttgca ccagtttttcc ggacagcggg gaatcccgga ttttcatgac attttcggga    840
agcgcctcaa atgtctctac ccttgcgcat gaactcgggc acgcgttcca tcaggaagca    900
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acgtttgcag agatgatagt ggcggacgcg actgtccagc aggccgagac gagggaagaa   1020
aagcttgttc ttctggagga taaagtgcaa agaagcgttg cgttcttcat gaacattcac   1080
gcaagatttc tatttgaaac gagattctac gaggaacgaa agcggggagt ggtaccggcc   1140
agccgcttga atgagctgat ggaagaggcg caaagagagg catactgcaa tgcgttagaa   1200
gaatatcatc cgctttttg ggcatcaaag cttcattttc acatcacgag ggtgccgttt   1260
tacaatttcc cttatacatt cggctacctg ttttctcttg gtatttacgc gttggcgctt   1320
gaagaaaaag acacattcga agagaagtat atggcgctat tgcgcgatac ggcttctatg   1380
acagtggagg atttggcgat gaagcatttg ggcgctgaca tcacaaagcg cgatttctgg   1440
gagaatgcca tcaagctggc tgtgcgtgac gccgaaacct ttttacaaat gaccgaatct   1500
taa                                                                 1503
```

```
<210>  4
<211>  500
<212>  PRT
<213>  Bacillus subtilis 168

<400>  4

Met Asn Arg Leu Ser Ala Asp Phe Gln Ser Ser Leu Val Thr Leu Asp
1               5                  10                  15


His Lys Leu Val Asp Ile Asn Gln Asp Val Trp Asn Glu Leu Leu Thr
            20                  25                  30


Lys Pro Gly Leu Arg Asp Val Ser Tyr Ile Leu Asn Glu Arg Arg Gln
        35                  40                  45
```

10576.204.ST25.txt

Arg Val Ala Glu Lys Leu Ser Pro Gly Lys Glu Lys Leu Ile Gly Asn
    50   55   60

Leu Ala Val Asp Gly Tyr His Ala Trp Ser Asp Leu Tyr Asn Met Val
65   70   75   80

Val Gly Lys Met Thr Ile Pro Tyr Glu Glu Asn Gly Glu Asn Lys Gln
            85   90   95

Leu Ser Val Gly Gln Ala Glu Asn Met Met Asp His Gln Asp Arg Thr
            100   105   110

Val Arg Lys Thr Val Tyr Glu Arg Phe Arg Gln Ala Trp Glu Ser Lys
        115   120   125

Gln Asp Ile Phe Ser Ser Thr Leu Asn His Leu Ala Gly Phe Arg Leu
    130   135   140

Glu Thr Tyr Lys Ala Arg Gly Trp Glu Asn Val Leu Lys Glu Pro Leu
145   150   155   160

Gln Ile Asn Arg Met Lys Lys Glu Thr Leu Asp Thr Met Trp Gln Val
            165   170   175

Ile Thr Glu Asn Lys Lys Pro Phe Val Gln Phe Leu Asn Arg Lys Ala
        180   185   190

Ser Met Leu Gly Leu Glu Lys Leu Ser Trp Tyr Asp Val Glu Ala Pro
        195   200   205

Ile Gly Ser Asp Gly Lys Val Tyr Ser Tyr Asp Glu Ala Ala Asn Ile
    210   215   220

Ile Thr Ser Gln Phe Ser Thr Phe Gly Lys Lys Leu Ser Ser Phe Thr
225   230   235   240

Glu Lys Ala Phe Arg Asp Gly Trp Ile Glu Ala Glu Asp Arg Ser Gly
            245   250   255

Lys Arg Val Gly Gly Phe Cys Thr Ser Phe Pro Asp Ser Gly Glu Ser
            260   265   270

Arg Ile Phe Met Thr Phe Ser Gly Ser Ala Ser Asn Val Ser Thr Leu
        275   280   285

Ala His Glu Leu Gly His Ala Phe His Gln Glu Ala Met Leu Asn Val
    290   295   300

Arg Pro Leu Asn Arg Ser Tyr Ala Met Asn Val Ala Glu Thr Ala Ser
305   310   315   320

Page 4

10576.204.ST25.txt

Thr Phe Ala Glu Met Ile Val Ala Asp Ala Thr Val Gln Gln Ala Glu
                  325   330   335

Thr Arg Glu Glu Lys Leu Val Leu Leu Glu Asp Lys Val Gln Arg Ser
              340   345   350

Val Ala Phe Phe Met Asn Ile His Ala Arg Phe Leu Phe Glu Thr Arg
          355   360   365

Phe Tyr Glu Glu Arg Lys Arg Gly Val Val Pro Ala Ser Arg Leu Asn
      370   375   380

Glu Leu Met Glu Glu Ala Gln Arg Glu Ala Tyr Cys Asn Ala Leu Glu
385   390   395   400

Glu Tyr His Pro Leu Phe Trp Ala Ser Lys Leu His Phe His Ile Thr
              405   410   415

Arg Val Pro Phe Tyr Asn Phe Pro Tyr Thr Phe Gly Tyr Leu Phe Ser
          420   425   430

Leu Gly Ile Tyr Ala Leu Ala Leu Glu Glu Lys Asp Thr Phe Glu Glu
          435   440   445

Lys Tyr Met Ala Leu Leu Arg Asp Thr Ala Ser Met Thr Val Glu Asp
      450   455   460

Leu Ala Met Lys His Leu Gly Ala Asp Ile Thr Lys Arg Asp Phe Trp
465   470   475   480

Glu Asn Ala Ile Lys Leu Ala Val Arg Asp Ala Glu Thr Phe Leu Gln
              485   490   495

Met Thr Glu Ser
          500

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<211> 297
<212> DNA
<213> Bacillus subtilis 168

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gacaggactg atgcgtttca ggtgcctgaa tcgcctgaag aggctgaagg ctgaccgcg   180

ttgcttgatt taatcgaaca gacatccgtc aagcttcagc aggccggcgc ttttgttgct   240

tgcctccagg cccagaatat caatgatcaa aaggctatag agcatcaggc ctcatga   297

<210> 6

10576.204.ST25.txt

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<211>  98
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<213>  Bacillus subtilis 168

<400>  6
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Met Ala Leu Gln Gly Val Gly Gln Arg Trp Asp Leu Asp Ser Phe Phe
1   5   10   15

Lys Gly Gly Ser Gln Ser Glu Glu Phe Lys Gly Tyr Ile Glu Lys Leu
            20   25   30

Ser Gln Ser Leu Arg Ala Phe Gln Asp Arg Thr Asp Ala Phe Gln Val
            35   40   45

Pro Glu Ser Pro Glu Glu Ala Glu Gly Leu Thr Ala Leu Leu Asp Leu
        50   55   60

Ile Glu Gln Thr Ser Val Lys Leu Gln Gln Ala Gly Ala Phe Val Ala
65   70   75   80

Cys Leu Gln Ala Gln Asn Ile Asn Asp Gln Lys Ala Ile Glu His Gln
                85   90   95

Ala Ser


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<210>  7
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<212>  DNA
<213>  artificial sequence

<220>
<223>  Primer yusZ1F

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ccttcccggg gctaagcttt tcggc                                            25


<210>  8
<211>  30
<212>  DNA
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<220>
<223>  Primer yusZ2R

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<210>  9
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<223>  Primer yusZ2F

<400>  9
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10576.204.ST25.txt

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<212>   DNA
<213>   artificial sequence

<220>
<223>   Primer yusZ3R

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<210>   11
<211>   25
<212>   DNA
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<220>
<223>   Primer yusX1F

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<223>   Primer yusX2R

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ggcgtcacgc acagcaacga gcgacgattg                                     30


<210>   13
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<223>   Primer yusX2F

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<210>   14
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<212>   DNA
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<220>
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<210>   15
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<212>   DNA
<213>   artificial sequence

<220>
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10576.204.ST25.txt
<223>   PCR product yuszSOEpcr

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gccggcctgc tgaagcttga cggatgtctg ttcgattaaa tcaagcaacg cggtcagccc   300

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cagactttgt gacagcttct caatataacc tttgaattct tccgattggc tcccgccctt   420

aaaaaatgaa tcaagatccc atctttggcc tacccttgc agcgccatat cacaaaaccc   480

ctttccttct ttcgttctat tatagaacaa ttctgaatta ttgtataaaa atttctatta   540

caggcgtcat ttcgtgttca ggatagtaca atagctgtag cagtttaata ggagggttag   600

gatgaataaa aaaatagcca tcgtgacagg agcgtccagc gcgtgggagt ctatcctgaa   660

gaaaaagcta ttcagctgat ctaaattata attattataa tttagtattg attttttattt   720

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acattgcacg agaaatttga agaactttat gaccatgcgg ctgaaacagt ggataccatc   960

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gtgtggatgc tttcctctta tttagggtaa caaaaaagct gaaccttaat cgggttcagc   1260

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atagcctttt gatcattgat attctgggcc tggaggcaag caacaaaagc gccggcctgc   240

tgaagcttga cggatgtctg ttcgattaaa tcaagcaacg cggtcagccc ttcagcctct   300

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10576.204.ST25.txt

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10576.204.ST25.txt

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gaaaaacaag ttaagggatg cagtttatgc atcccttaac ttacttatta aataatttat   2640

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10576.204.ST25.txt

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Leu Leu Thr Ala Leu Lys Leu Ala Ser Thr His Phe Val Ile Ala Thr
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gcg cgc cat cca gaa aaa gcg gaa gct ctg cgg aac cgt ata gcg gag         144
Ala Arg His Pro Glu Lys Ala Glu Ala Leu Arg Asn Arg Ile Ala Glu
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ctg tcg atc gag tca tcg att gcc gtc gct gaa ctt gat gtc aca aac         192
Leu Ser Ile Glu Ser Ser Ile Ala Val Ala Glu Leu Asp Val Thr Asn
    50              55              60

gaa caa tcg att tcc tca ttt tcc gaa gag ctg aag cag tac gga cag         240
Glu Gln Ser Ile Ser Ser Phe Ser Glu Glu Leu Lys Gln Tyr Gly Gln
65              70              75              80

ata gac gtt ctc atc aat aat gca gga acg gca tac ggc gga ttc gct         288
Ile Asp Val Leu Ile Asn Asn Ala Gly Thr Ala Tyr Gly Gly Phe Ala
                85              90              95

gaa gag ctt tct ctt ggc gac tac aga aaa cag tat gac acc aat gtt         336
Glu Glu Leu Ser Leu Gly Asp Tyr Arg Lys Gln Tyr Asp Thr Asn Val
            100             105             110

ttc ggc ctg gtg gca gtc aca aaa gcg gtc ctt cct tat atg aag aaa         384
Phe Gly Leu Val Ala Val Thr Lys Ala Val Leu Pro Tyr Met Lys Lys
            115             120             125

cac agc ggc gcc aaa atc atc aat ctg agc agc atc agc ggg cgg atc         432
His Ser Gly Ala Lys Ile Ile Asn Leu Ser Ser Ile Ser Gly Arg Ile
    130             135             140

gct ttc ccc gct ttc tcg gca tat gct tca tca aag cat gca gtt gaa         480
Ala Phe Pro Ala Phe Ser Ala Tyr Ala Ser Ser Lys His Ala Val Glu
145             150             155             160

ggc ttt tca gaa agc ctc cgc ctc gaa ctc cgt cca ttc ggc atc aat         528
Gly Phe Ser Glu Ser Leu Arg Leu Glu Leu Arg Pro Phe Gly Ile Asn
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gtg gcc gtc gtc cag ccg gga tcg tac cag acg gcg att tgg gag aca         576
Val Ala Val Val Gln Pro Gly Ser Tyr Gln Thr Ala Ile Trp Glu Thr
            180             185             190

tcg ttt gcc gcc caa gtc act gca cct gat gcc gaa tca cag tac aaa         624
Ser Phe Ala Ala Gln Val Thr Ala Pro Asp Ala Glu Ser Gln Tyr Lys
            195             200             205

aca tat ttc gag cgg atc tcc gcc tac att gca gcg agc cgc aaa cat         672
Thr Tyr Phe Glu Arg Ile Ser Ala Tyr Ile Ala Ala Ser Arg Lys His
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Tyr Gly Asn Pro Asp Asp Val Ala Glu Leu Ile Cys Arg Leu Ala Ala
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aaa aag cgg ctg aac agg ctg cgc tat ccg atc ggc agg ggc gtc cgt         768
Lys Lys Arg Leu Asn Arg Leu Arg Tyr Pro Ile Gly Arg Gly Val Arg
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ctc tcg atc ctt ctc cac caa atc ctg cca tgg cgg att tgg gaa cgt         816
Leu Ser Ile Leu Leu His Gln Ile Leu Pro Trp Arg Ile Trp Glu Arg
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10576.204.ST25.txt
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Ala Arg His Pro Glu Lys Ala Glu Ala Leu Arg Asn Arg Ile Ala Glu
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Leu Ser Ile Glu Ser Ser Ile Ala Val Ala Glu Leu Asp Val Thr Asn
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Glu Gln Ser Ile Ser Ser Phe Ser Glu Glu Leu Lys Gln Tyr Gly Gln
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Ile Asp Val Leu Ile Asn Asn Ala Gly Thr Ala Tyr Gly Gly Phe Ala
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Glu Glu Leu Ser Leu Gly Asp Tyr Arg Lys Gln Tyr Asp Thr Asn Val
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Phe Gly Leu Val Ala Val Thr Lys Ala Val Leu Pro Tyr Met Lys Lys
          115   120   125

His Ser Gly Ala Lys Ile Ile Asn Leu Ser Ser Ile Ser Gly Arg Ile
      130   135   140

Ala Phe Pro Ala Phe Ser Ala Tyr Ala Ser Ser Lys His Ala Val Glu
145   150   155   160

Gly Phe Ser Glu Ser Leu Arg Leu Glu Leu Arg Pro Phe Gly Ile Asn
              165   170   175

Val Ala Val Val Gln Pro Gly Ser Tyr Gln Thr Ala Ile Trp Glu Thr
              180   185   190

Ser Phe Ala Ala Gln Val Thr Ala Pro Asp Ala Glu Ser Gln Tyr Lys
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Thr Tyr Phe Glu Arg Ile Ser Ala Tyr Ile Ala Ala Ser Arg Lys His
      210   215   220

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Tyr Gly Asn Pro Asp Asp Val Ala Glu Leu Ile Cys Arg Leu Ala Ala
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Lys Lys Arg Leu Asn Arg Leu Arg Tyr Pro Ile Gly Arg Gly Val Arg
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Leu Ser Ile Leu Leu His Gln Ile Leu Pro Trp Arg Ile Trp Glu Arg
            260              265              270
```

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Ala Val Ile Lys Lys Leu Leu Lys
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10576.204.ST25.txt

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